

*Extract of a Letter from Dr. Wolfers to the Rev. R. Main,
dated Berlin, October 31, 1862.*

The xxth volume of the *Radcliffe Observations*, presented to me by the Radcliffe Trustees, came into my hands some time ago, and I have compared the places of the fundamental stars contained in that volume with those contained in the *Tabulae Reductionum*. In this manner I have formed the two tables, A and B, belonging respectively to the years 1859 and 1860. There are some differences between observation and calculation (F.—W.), which are too great to be attributed to errors of observation. It is possible that there is an error committed in the reduction of the observations, wherefore I have included in [the] differences in question. These being excepted, I have combined the two series of differences with the series obtained in the year 1861, and published in the *Monthly Notices*, vol. xxii. No. 2, p. 31. In this manner I have obtained the table designated by the letter C.

Excluding now the R.A. of the circumpolar stars α and γ *Ursæ Majoris*, α , β , and δ *Ursæ Minoris*, and of α *Geminorum* (the latter for a reason previously given), the result of the comparison is the following :—

Number of Observations.	F.—W. in R.A.	Number of Observations.	F.—W. in Decl.
448	+0.110	307	+0.032

This result being compared with the result of the preceding year, viz.

Number of Observations.	F.—W. in R.A.	Number of Observations.	F.—W. in Decl.
326	+0.017	288	+0.046

it is evident that, as the number of observations is increased, the mean difference of the two co-ordinates is diminished. These values belong to January 1, 1860.

A.

Right Ascensions and Declinations of Fundamental Stars observed at the Radcliffe Observatory in the Year 1859, compared with those contained in the Tabulae Reductionum.

Name of Star.	Number of Observations.	F.—W. R.A.	Number of Observations.	F.—W. Decl.
α Andromedæ	1	0°00		
γ Pegasi	3	-0.11		
α Arietis	1	-0.01		
α Ceti	1	+0.08		
α Geminorum			1	+2°0

Name of Star.	Number of Observations.	F.—W. R.A.	Number of Observations.	F.—W. Decl.
α Canis Minoris	1	[+0°15]	1	-1°2
β Geminorum	1	-0°04		
α Hydræ	3	-0°02		
α Leonis	1	0°00		
β Leonis	1	+0°05		
α Virginis	3	0°00	1	-0°1
η Ursæ Majoris			1	-2°7
α Böötis	1	+0°01		
α Coronæ	1	-0°02		
α Serpentis	1	-0°04		
α Herculis	1	0°00		
α Ophiuchi	4	-0°02	1	-0°3
α^1 Capricorni	1	+0°07		
α Cygni	2	-0°04		
α Aquarii	5	-0°03	1	-0°3

B.

*Right Ascensions and Declinations of Fundamental Stars,
observed at the Radcliffe Observatory in the Year 1860,
compared with those contained in the Tabulae Reductionum.*

Name of Star.	Number of Observations.	F.—W. R.A.	Number of Observations.	F.—W. Decl.
α Andromedæ	2	[−0°13]		
γ Pegasi	3	[−0°20]		
α Arietis	5	-0°02	1	+2°8
α Ceti	4	-0°05		
α Tauri	1	[−0°27]		
β Leonis	1	+0°05		
β Virginis	2	+0°11		
γ Ursæ Majoris	1	[+0°41]		
η Ursæ Majoris	4	[+0°18]		
α Böötis	1	[−0°38]		
α^2 Libræ	1	+0°06		
β Ursæ Minoris			1	-2°2
α Serpentis	1	+0°11		
α Scorpii	1	[−0°28]		
α Herculis	2	-0°07		
α Ophiuchi	4	-0°04		
γ Draconis	4	+0°12		
α Lyrae	2	-0°03		
γ Aquilæ	9	-0°10	3	-0°6

Name of Star.	Number of Observations.	F.—W. R.A.	Number of Observations.	F.—W. Decl.
α Aquilæ	9	-0°01 ⁸		
β Aquilæ	11	+0°03	2	-2°0
α^2 Capricorni	2	+0°13		
α Cygni	14	-0°07		
α Cephei	5	[+0°37]	1	+0°7
β Cephei			4	[-4°6]
α Aquarii	9	-0°06		
α Piscis Austrini	1	-0°01		
α Pegasi	10	+0°02	1	-2°0
α Ursæ Minoris	6	-0°15	3	+0°8
δ Ursæ Minoris			1	+1°5

C.

Right Ascensions and Declinations of Fundamental Stars observed at the Radcliffe Observatory in the Year 1861, compared with those contained in the Tabulæ Reductionum.

Name of Star.	Number of Observations.	F.—W. R.A.	Number of Observations.	F.—W. Decl.
α Andromedæ	5	+0°02	5	+0°7
γ Pegasi	12	-0°06	6	+2°6
α Cassiopeiae	3	+0°09	4	-0°4
α Arietis	12	-0°02	4	+1°8
α Ceti	14	0°00	4	+0°4
α Persei	5	-0°06	3	-0°2
α Tauri	16	-0°02	9	+0°2
α Aurigæ	5	-0°01	6	-0°6
β Orionis	8	0°00	7	+0°4
β Tauri	5	+0°05	6	+2°5
α Orionis	8	+0°02	5	+1°4
α Canis Majoris	8	-0°02	20	-0°4
α Geminorum	10	+0°12	9	+1°8
α Canis Minoris	11	+0°03	10	+0°4
β Geminorum	17	-0°01	10	+0°3
α Hydræ	12	+0°04	7	-2°1
α Leonis	16	+0°01	12	+1°1
α Ursæ Majoris	5	+0°32	12	+0°6
β Leonis	11	+0°07	6	-0°3
β Virginis	11	+0°12	5	-0°4
γ Ursæ Majoris	5	+0°21	2	+0°2
α Virginis	15	+0°06	15	-1°2
η Ursæ Majoris	10	+0°06	3	-1°4
α Böötis	7	+0°02	2	+0°4

Name of Star.	Number of Observations.	F.—W. R.A.	Number of Observations.	F.—W. Decl.
α^1 Librae	1	+ 0° 04 ⁸	5	- 0° 4
α^2 Librae	11	+ 0° 10	3	- 0° 6
β Ursæ Minoris	1	- 0° 26	6	- 0° 5
α Coronæ	10	+ 0° 01	3	- 0° 7
α Serpentis	12	+ 0° 01	3	- 0° 4
α Scorpii	12	+ 0° 14	7	- 0° 2
α Herculis	9	- 0° 08	1	- 0° 2
α Ophiuchi	18	- 0° 02	9	- 0° 1
γ Draconis	9	+ 0° 07	4	- 0° 3
α Lyrae	13	+ 0° 05	8	- 0° 4
γ Aquilæ	15	- 0° 06	6	- 0° 7
α Aquilæ	19	- 0° 03	9	+ 0° 3
β Aquilæ	15	+ 0° 03	6	- 0° 5
α^1 Capricorni	1	+ 0° 07	2	- 1° 8
α^2 Capricorni	7	+ 0° 04	5	- 2° 8
α Cygni	24	- 0° 05	6	- 2° 4
α Cephei	11	- 0° 07	8	+ 0° 9
β Cephei	4	- 0° 11	10	+ 0° 2
α Aquarii	23	- 0° 05	3	- 0° 8
α Piscis Austrini	9	- 0° 02	8	- 0° 4
α Pegasi	14	- 0° 02	7	- 0° 5
α Ursæ Minoris	14	- 0° 20	7	+ 0° 3
δ Ursæ Minoris	4	+ 0° 48	10	+ 1° 8

[*Note by Mr. Main.* Of the anomalous results in R.A., referred to by Dr. Wolfers, I may state that the R.A. of *Arcturus*, included in the Catalogue of Stars for 1860, should be rejected, as the number of determining clock-stars is too small. It has crept in by inadvertence. In addition to this, there must have been something singularly wrong in the observation, as will be immediately seen by comparing the clock-error given by it with that given by η *Böötis* (Nov. 21). Of the rest, the R.A.'s of *Aldebaran*, *Procyon*, γ *Ursæ Majoris*, and *Antares*, depend on single observations.]

The anomalous cases occurring in 1860, October 11 and November 21, had been scrutinised before the observations passed the press; and the anomalies are due to strange errors in the observations, not to errors in the reductions.

In future years much better means will be given for the continuation of Dr. Wolfers' researches on the places of the fundamental stars, as clock-errors are determined by the same list of stars as that used at Greenwich, and the assumed equinox will be identical with the Greenwich assumed equinox.]

18 M. Auwers, on the Proper Motion of Procyon.

For the following abstract of Mr. Auwers' paper, On the Irregularities of the Motion of *Procyon*, and on the Determination of the Elements of an obscure Companion of *Procyon*, the attraction of which will explain these irregularities, the Society and myself are indebted to W. T. Lynn, Esq., Assistant of the Royal Observatory of Greenwich.

It may be necessary to correct a misunderstanding that might possibly be produced in the minds of some readers by the expressions of the first paragraph. The irregularities in the annual motions of stars generally, and of *Procyon* in particular, were first pointed out by Mr. Pond. In the *Greenwich Observations*, 1820-22, is a Table of "Right Ascensions of the 36 Stars of the Greenwich Catalogue, reduced to the beginning of the year 1819, from five years' observations with the new Transit Instrument, 1817-1821, and compared with Dr. Maskelyne's Catalogue of the year 1805 brought up to the same period;" the principal discordances are those of α^2 *Capricorni*, *Sirius*, *Spica*, *Procyon*. In the *Greenwich Observations*, 1825, is "A Table showing the difference between the predicted and observed N.P.D. of 45 principal fixed stars for the year 1826;" the principal discordances are those of α *Pegasi*, γ *Aquilæ*, *Sirius*, *Procyon*. In the *Philosophical Transactions*, 1823, page 36, Mr. Pond says, "A very great deviation in N.P.D. will be found in three very bright stars, *Capella*, *Procyon*, and *Sirius*;" in page 44 he again specifies *Procyon* and *Sirius*, and in page 529, he speaks of the impossibility of exactly interpolating or predicting a star's place. Finally, in the Introduction to the Catalogue of 1112 stars, dated June 27, 1833, he says, "We can hardly desire a better test of our power of predicting the future position of the stars, than by trying by the same formulæ how accurately we can interpolate for the past. In a variety of papers, which I have submitted at times to the Royal Society, I have endeavoured to show that *with us* the latter experiment entirely fails."

G. B. AIRY.

Abstract of the Paper by Auwers on the Proper Motion of Procyon, contained in Nos. 1371, 1372, and 1373, of the Astronomische Nachrichten.

In this paper Auwers first gives the history of the investigations made into the proper motions of *Sirius* and *Procyon* thus: Bessel discovered in 1844 that the observed Right Ascensions of *Sirius* and Declinations of *Procyon* negatived the existence of an invariable Proper Motion of those stars, and showed that its variability was to be explained by the attraction of bodies connected with them, and forming thereby binary systems, the remaining components of which were not perceptible to us, or at least had not hitherto been perceived. Doubt was on various sides thrown upon this result, new,